

**REMARKS**

This is in response to the Office Action mailed October 15, 2002. Claims 1-13 are pending in this application. New Claims 12-13 have been added, and Claims 1 and 2 have been amended, as described in more detail below.

The Abstract has been replaced with a new Abstract to conform with Claim 1 as amended.

A Supplemental Information Disclosure Statement pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, copies of the documents cited in the Information Disclosure Statement, a Form PTO-1449 listing the documents, and the fee under 37 C.F.R. 1.7(p) are enclosed.

Claims 1, 2, and 8-11 have been rejected under 35 U.S.C. § 103(a) as being obvious over JP 55-36266 (Mayama) in view of U.S. Patent No. 4,500,672 (Suzuki). According to the Examiner, Mayama discloses a tire construction with an intermediate layer having a composition comprising natural rubber and styrene butadiene rubber. The Examiner acknowledges that Mayama is silent with respect to the BET surface area and DBP oil absorption of the carbon black, and with respect to the makeup of the styrene butadiene copolymer. However, the Examiner takes the position that it would have been obvious to one of ordinary skill in the art to modify Mayama with carbon black and with a styrene butadiene copolymer having the claimed limitations (Official Action, p. 3, lines 3-10), and further that it would have been obvious to modify the carbon black makeup in view of the teachings of Suzuki (Official Action, p. 3, line 11 – p. 4, line 3), to obtain the present invention.

However, it is respectfully submitted that Claims 1, 2 and 8-11 are nonobvious and patentable over Mayama in view of Suzuki. Claim 1 has been amended to delete the recitation "an elastomer comprising" and to recite that the intermediate layer contains a composition comprising "a natural or synthetic polyisoprene having a majority of chains with cis-1,4 bonds and a copolymer prepared in solution of one or more conjugated diene monomers and one or more vinyl aromatic monomers...." Claim 2 has been amended to replace the term "elastomer" with the term "composition" and to delete the recitation "and a copolymer prepared in solution from conjugated diene and vinyl aromatic monomers," which is redundant in light of the amendment of Claim 1 described above. It is respectfully submitted that the amendments to Claims 1 and 2 are supported by the specification as originally filed (*see, e.g.*, Specification, p. 8, lines 10-11) and therefore do not constitute new matter.

With regard to Mayama, Applicants first respectfully note that the Examiner has cited Mayama as prior art, but has only provided an English abstract for the reference and has not provided an English translation of the reference. Applicants respectfully request that Examiner provide a translation of the reference. *See Ex parte Jones*, 62 U.S.P.Q.2d 1206, 1209 (Bb. Pat. App. & Int. 2001) ("In our view, obtaining translations is the responsibility of the examiner."). In addition, and in contrast to Claim 1 of the instant application, the Japio Abstract of Mayama, cited by the Examiner, discloses under the heading "Constitution" a reinforcing layer "containing natural rubber and/or a diene synthetic rubber" (emphasis added). Therefore, it is respectfully submitted that the reinforcing layer of Mayama may either be based on natural rubber as the sole elastomer or based on a diene synthetic rubber as the sole elastomer (emphasis added),

and not a polyisoprene and a copolymer of one or more conjugated diene monomers and one or more vinyl aromatic monomers, as required by Claim 1 of the instant application (emphasis added). A composition based on natural rubber as the sole elastomer or a diene synthetic rubber as the sole elastomer would exhibit much poorer properties than the compositions of the invention, as shown in Test 1 and Test 2 of Example 1 and in Table 2 of the instant Specification. The Examiner is also respectfully referred to the enclosed two additional abstracts of Mayama, which are disclosed in the enclosed Information Disclosure Statement. The Derwent Abstract of Mayama states that the intermediate layer comprises "100 pts. wt. of rubber component consisting of  $\geq 1$  of natural rubber or diene type synthetic rubber" (emphasis added). Similarly, the Kokai Tokyo Koho Abstract, reference: 93: 27582y ("the Kokai Abstract") of Mayama states that a typical example of a composition for the reinforcing layer is a composition containing 100 phr of natural rubber. Accordingly, it is respectfully submitted that the Japio, Derwent and Kokai Abstracts show that Mayama uses either natural rubber or a diene synthetic rubber in the reinforcing layer, and further that a preferred mode of Mayama uses only natural rubber in the reinforcing layer. Mayama does not disclose or suggest using both a natural rubber and a diene synthetic rubber, as required by Claim 1 of the present application.

Moreover, even if one assumed that Mayama discloses or suggests a combination of natural rubber and of a diene synthetic rubber, Mayama does not disclose or suggest the particular composition comprising a copolymer of one or more conjugated diene monomers and one or more vinyl aromatic monomers which is recited in Claim 1 of the instant application. Accordingly, it would not be obvious for a person skilled in

the art to select the composition recited in Claim 1 on the basis of the disclosure of Mayama of diene synthetic rubbers. Diene synthetic rubbers encompass a very large class of synthetic rubbers which includes a very large number of synthetic rubbers that do not meet the limitations of Claim 1, such as, for example, homopolymers of conjugated dienes, and which would not be suitable for use in the instant invention.

Furthermore, Claim 1 as amended recites that the copolymer of one or more conjugated diene monomers and one or more vinyl aromatic monomers is prepared in solution. In contrast, Mayama does not disclose or suggest that a copolymer of one or more conjugated diene monomers and one or more vinyl aromatic monomers is prepared in solution. On the contrary, the only example of diene synthetic rubber which is disclosed by Mayama is a copolymer of styrene / butadiene (SBR) having the commercial name "SBR 1500", as shown in Columns 6, 8 and 13 of Mayama, which the Examiner is respectfully referred to. Although a translation of Mayama has not been provided to the Applicants, Applicants respectfully submit that the name "SBR 1500" is clearly recognizable in Columns 6, 8 and 13 of Mayama. It is respectfully submitted that SBR 1500 is well known in the art as a copolymer prepared in emulsion, and not in solution (emphasis added).

Furthermore, the purpose of the present invention is to obtain an improved life span of the tires (see Specification, page 7, line 2), such as tires for motor vehicles bearing heavy loads, including truck tires. In contrast, the aim of Mayama is not to improve the life span of a tire. As clearly stated in the Japio Abstract of Mayama, under the heading "Purpose," the aim of Mayama is merely to reduce the thickness of the carcass ply and thus the weight of the tire. Similarly, the Kokai Abstract of Mayama

states that the tire is "a 7.25 kg tire with initial pressure 2 kg/cm<sup>2</sup> and drum endurance test 20,000 km". It is clear that the purpose of Mayama is to reduce the weight of a passenger tire having a life span of merely 20,000 km (emphasis added). Such a life span does not represent an improved life span for tires, such as tires for motor vehicles bearing heavy loads, including truck tires, which is the purpose of the present invention.

Mayama thus fails to disclose or suggest a copolymer of one or more conjugated diene monomers and one or more vinyl aromatic monomers, as recited in Claim 1 as amended. Mayama also fails to disclose or suggest that the copolymer is prepared in solution, as recited in Claim 1 as amended. Mayama also has a different purpose from the purpose of the present invention. Suzuki, like Mayama, does not disclose or suggest that the copolymer is a copolymer of one or more conjugated diene monomers and one or more vinyl aromatic monomers, or that the copolymer is prepared in solution. Moreover, Suzuki, like Mayama, has a different purpose from the purpose of the present invention. Suzuki is concerned with the use of specific carbon blacks, and does not address the use of reinforcing layers of tires to improve life span, which is the goal of the present invention. Accordingly, Suzuki does not cure the deficiencies of Mayama.

For all the foregoing reasons, it would not have been obvious to one of ordinary skill in the art to obtain the invention of Claim 1 as amended over Mayama, alone or in combination with Suzuki. Claims 2 and 8-11 ultimately depend on Claim 1 and are therefore likewise nonobvious and patentable over Mayama in view of Suzuki. Furthermore, Claim 2 expressly recites the limitation  $D \geq 66 - 1.58 \cdot VA$ , where D is the percentage amount of diene chains having a 1,2 bound content, and VA is the percentage

amount of vinyl aromatic chains. In contrast, as discussed above, the only example diene synthetic rubber which is disclosed by Mayama, on pages 2-4, is the SBR 1500 copolymer. SBR 1500 is known in the art to have values of D and of VA equal to 18.9 % and 23.5 %, respectively. Accordingly, the value of D disclosed by Mayama (18.9%) is smaller than the value of  $66 - 1.58$ . VA disclosed by Mayama (28.87%). Therefore, Mayama does not disclose or suggest values of D and VA such that  $D \geq 66 - 1.58$ . VA, as required by Claim 2.

In view of the foregoing amendments and remarks, withdrawal of the rejection of Claims 1, 2 and 8-11 under 35 U.S.C. § 103(a) as obvious over Mayama in view of Suzuki is respectfully requested.

Claims 3 and 5 have been rejected under 35 U.S.C. § 103(a) as being obvious over Mayama in view of Suzuki as applied to Claim 1 above, and further in view of U.S. Patent No. 6,156,822 (Materne). The teachings of Mayama and Suzuki have been discussed above. The Examiner's position is that Materne describes additional filler components wherein surface-active groups are present. The Examiner concludes that it would have been obvious to modify Mayama in combination with Suzuki according to the teachings of Materne to obtain the invention claimed in Claims 3 and 5.

However, it is respectfully submitted that Claims 3 and 5 are nonobvious and patentable over Mayama in view of Suzuki as applied to Claim 1 above and further in view of Materne. Claims 3 and 5 depend on Claim 1 or 2, neither of which, for the reasons discussed above, is obvious over Mayama in view of Suzuki. Materne, like Mayama and Suzuki, fails to disclose or suggest that the copolymer is a copolymer of one

or more conjugated diene monomers and one or more vinyl aromatic monomers, or that the copolymer is prepared in solution. Moreover, Materne, like Mayama and Suzuki, fails to disclose or suggest the purpose of the present invention, which is to use reinforcing layers of tires to improve life span. Therefore, Materne fails to cure the deficiencies of Mayama and Suzuki.

For the foregoing reasons, it would not have been obvious to one of ordinary skill in the art to obtain the invention of Claims 3 and 5 over Mayama in view of Suzuki as applied to Claim 1 above and further in view of Materne. In view of the foregoing amendments and remarks, withdrawal of the rejection of Claims 3 and 5 under 35 U.S.C. § 103(a) as obvious over Mayama in view of Suzuki as applied to Claim 1 above and further in view of Materne is respectfully requested.

Claim 4 has been rejected under 35 U.S.C. § 103(a) as being obvious over Mayama, Suzuki and Materne as applied to Claim 3 above, and further in view of U.S. Patent No. 6,333,375 (Nakamura). The teachings of Mayama, Suzuki and Materne have been discussed above. The Examiner's position is that Nakamura suggests a silica filler having a preferred BET range within the limitations of Claim 4, and that it would have been obvious to modify Mayama in combination with Suzuki and with Materne according to the teachings of Nakamura to obtain the invention claimed in Claim 4.

However, it is respectfully submitted that Claim 4 is nonobvious and patentable over Mayama, Suzuki and Materne as applied to Claim 3 and further in view of Nakamura. Claim 4 depends on Claim 3 which, for the reasons discussed above, is not obvious over Mayama in view of Suzuki and further in view of Materne. Nakamura, like

Mayama, Suzuki and Materne, fails to disclose or suggest that the copolymer is a copolymer of one or more conjugated diene monomers and one or more vinyl aromatic monomers, or that the copolymer is prepared in solution. Moreover, Nakamura, like Mayama, Suzuki and Materne, fails to disclose or suggest the purpose of the present invention, which is to use reinforcing layers of tires to improve life span. Therefore, Nakamura fails to cure the deficiencies of Mayama, Suzuki and Materne.

For the foregoing reasons, it would not have been obvious to one of ordinary skill in the art to obtain the invention of Claim 4 over Mayama, Suzuki and Materne as applied to Claim 3 and further in view of Nakamura. In view of the foregoing amendments and remarks, withdrawal of the rejection of Claim 4 under 35 U.S.C. § 103(a) as obvious over Mayama, Suzuki and Materne as applied to Claim 3 and further in view of Nakamura is respectfully requested.

Claim 6 has been rejected under 35 U.S.C. § 103(a) as being obvious over Mayama in view of Suzuki as applied to Claim 1, and further in view of U.S. Patent No. 5,504,159 (Sturm). The teachings of Mayama and Suzuki have been discussed above. The Examiner's position is that Sturm describes the use of p-phenylene to prevent degradation caused by oxidation. The Examiner concludes that it would have been obvious to modify Mayama in combination with Suzuki according to the teachings of Sturm to obtain the invention claimed in Claim 6.

However, it is respectfully submitted that Claim 6 is nonobvious and patentable over Mayama in view of Suzuki as applied to Claim 1 and further in view of Sturm. Claim 6 depends on Claim 1 or 2, neither of which, for the reasons discussed



above, is obvious over Mayama in view of Suzuki. Sturm, like Mayama and Suzuki, fails to disclose or suggest that the copolymer is a copolymer of one or more conjugated diene monomers and one or more vinyl aromatic monomers, or that the copolymer is prepared in solution. Moreover, Sturm, like Mayama and Suzuki, fails to disclose or suggest the purpose of the present invention, which is to use reinforcing layers of tires to improve life span. Therefore, Sturm fails to cure the deficiencies of Mayama and Suzuki.

For the foregoing reasons, it would not have been obvious to one of ordinary skill in the art to obtain the invention of Claim 6 over Mayama in view of Suzuki as applied to Claim 1 and further in view of Sturm. In view of the foregoing amendments and remarks, withdrawal of the rejection of Claim 6 under 35 U.S.C. § 103(a) as obvious over Mayama in view of Suzuki as applied to Claim 1 and further in view of Sturm is respectfully requested.

Claim 7 has been rejected under 35 U.S.C. § 103(a) as being obvious over Mayama in view of Suzuki as applied to Claim 1, and further in view of U.S. Patent No. 3,56,3928 (King). The teachings of Mayama and Suzuki have been discussed above. The Examiner's position is that King describes the use of an organic salt in an amount which incorporates nearly the entire range of the claimed invention. The Examiner concludes that it would have been obvious to modify Mayama in combination with Suzuki according to the teachings of King to obtain the invention claimed in Claim 7.

However, it is respectfully submitted that Claim 7 is nonobvious and patentable over Mayama in view of Suzuki as applied to Claim 1 and further in view of King. Claim 7 depends on Claim 1 or 2, neither of which, for the reasons discussed

above, is obvious over Mayama in view of Suzuki. King, like Mayama and Suzuki, fails to disclose or suggest that the copolymer is a copolymer of one or more conjugated diene monomers and one or more vinyl aromatic monomers, or that the copolymer is prepared in solution. Moreover, King, like Mayama and Suzuki, fails to disclose or suggest the purpose of the present invention, which is to use reinforcing layers of tires to improve life span. Therefore, King fails to cure the deficiencies of Mayama and Suzuki.

For the foregoing reasons, it would not have been obvious to one of ordinary skill in the art to obtain the invention of Claim 7 over Mayama in view of Suzuki as applied to Claim 1 and further in view of King. In view of the foregoing amendments and remarks, withdrawal of the rejection of Claim 7 under 35 U.S.C. § 103(a) as obvious over Mayama in view of Suzuki as applied to Claim 1 and further in view of King is respectfully requested.

New Claims 12 and 13 have been added to further claim the invention. It is respectfully submitted that new Claims 12 and 13 are supported by the specification as originally filed (*see* p. 13, lines 4-5 and p. 9, lines 7-9 of the Specification) and therefore do not constitute new matter. New Claims 12 and 13 depend on Claim 1 which, as discussed above, is patentable over the cited references. Therefore, it is respectfully submitted that new Claims 12 and 13 are also patentable.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,



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**VERSION WITH MARKINGS TO SHOW CHANGES MADE****In the Abstract:**

Please replace the Abstract with the Abstract attached on a separate sheet hereto.

**In the Claims:**

Please amend the claims as follows:

1. (Amended) A tire comprising:
  - (a) a carcass ply based on metal cords and an elastomeric carcass layer coating said cords,
  - (b) an inner elastomeric layer which defines the radially inner face of said tire, thereby circumscribing the inner space of the tire, and which protects the carcass ply from diffusion of air coming from the inner space of the tire, and
  - (c) an intermediate reinforcement layer located between said carcass ply and said inner layer, said intermediate layer being formed from a composition comprising:
    - (i) [an elastomer comprising:]
 

a natural or synthetic polyisoprene having a majority of chains with cis-1,4 bonds and a copolymer prepared in solution of one or more conjugated diene [polymers] monomers and one or more vinyl aromatic [polymers] monomers, said copolymer simultaneously satisfying the following relationships:

      - (1)  $D \geq 60 - 1.75 \cdot VA$
      - (2)  $D \leq 116 - 1.64 \cdot VA$
      - (3)  $D > 10$
      - (4)  $VA > 10$ ,

wherein D is the amount of diene chains having a 1, 2 bond content (in %) and VA is the amount of vinyl aromatic chains (in %), and

(ii) carbon black, in an amount of 25 to 85 parts by weight per hundred parts of said elastomer (phr),

wherein said carbon black has values of DBP oil absorption (in ml/100 g) and of BET specific surface area (in m<sup>2</sup>/g) which fulfil the following relationship:

$$\text{DBP} \leq -0.88 \cdot \text{BET} + 190.$$

2. (Amended) The tire according to Claim 1, wherein the [elastomer] composition comprises

(a) polyisoprene having a greater than 80% cis-1,4 bond content [and a copolymer prepared in solution from conjugated diene and vinyl aromatic monomers], wherein the conjugated diene monomers are selected from the group consisting of butadiene, isoprene and mixtures thereof and the vinyl aromatic monomers are selected from the group consisting of styrene,  $\alpha$ -methylstyrene and mixtures thereof,

said copolymer satisfying the following relationships:

(i)  $D \geq 66 - 1.58 \cdot VA$

(ii)  $D \leq 124 - 1.71 \cdot VA$

(iii)  $D > 10$

(iv)  $VA > 10$ ,

wherein D is the amount of diene chains having a 1, 2 content (in %) and VA is the amount of vinyl aromatic chains (in %), and

(b) carbon black having values of DBP oil absorption (in ml/100 g)

and of BET specific surface area (in  $\text{m}^2/\text{g}$ ) that fulfil the following relationship:

$$\text{DBP} \leq -0.88 \cdot \text{BET} + 185$$

The following new claims have been added:

12. (New) A tire according to Claim 1 or 2, wherein the composition further comprises kaolin.
13. (New) The tire according to Claim 1 or 2, wherein the tire is a tire for a motor vehicle bearing a heavy load.